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94th Congress
2d Session

COMMITTEE PRINT

Committee
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# THE UNIFORM TIME ACT OF 1966 AND OTHER RELATED ACTS AND BACKGROUND INFORMATION FOR COMMITTEE CONSIDERATION OF H.R. 13089 AND SIMILAR BILLS RELATING TO DAYLIGHT SAVING TIME

PREPARED BY THE STAFF

FOR THE USE OF THE

COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
U.S. HOUSE OF REPRESENTATIVES

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# THE UNIFORM TIME ACT OF 1966 AND OTHER RELATED ACTS AND BACKGROUND INFORMATION FOR COMMITTEE CONSIDERATION OF H.R. 13089 AND SIMILAR BILLS RELATING TO DAYLIGHT SAVING TIME

[SUBCOMMITTEE PRINT]

JUNE 30, 1976

**Showing H.R. 13089 as ordered reported by the subcommittee**

94TH CONGRESS
2D SESSION

# H. R. 13089

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IN THE HOUSE OF REPRESENTATIVES

APRIL 7, 1976

Mr. ROONEY introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce

[Omit the part struck through and insert the part printed in italic]

---

# A BILL

To amend the Uniform Time Act of 1966 to change the period of observance of daylight savings time.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That this Act may be cited as the "Daylight Savings Time Act of 1976".

SEC. 2. The purpose of this Act is to provide that the standard time of each time zone in the United States shall be advanced one hour during the period of each year beginning with the third Sunday of March and ending with the third Sunday of October, rather than during the period

1 beginning with the last Sunday of April and ending with the
2 last Sunday of October.

3 SEC. 3. Section 3 (a) of the Uniform Time Act of 1966
4 (15 U.S.C. 260a (a)) is amended by striking out "last
5 Sunday of April" and inserting in lieu thereof "third Sunday
6 of March" and by striking out "last Sunday of October" and
7 inserting in lieu thereof "third Sunday of October".

8 SEC. 4. (a) The amendments made by section 3 of
9 this Act shall not affect any law of any State enacted under
10 section 3 (a) of the Uniform Time Act of 1966 (15 U.S.C.
11 260a (a)) to exempt such State or a part of such State from
12 the provisions of such section providing for the advance-
13 ment of time.

14 (b) For the purposes of this section, the term "State"
15 has the meaning given such term by section 7 of the Uniform
16 Time Act of 1966 (15 U.S.C. 267).

17 SEC. 5. Notwithstanding any other law or any regula-
18 tion issued under any such law, the Federal Communications
19 Commission shall, consistent with any existing treaty or other
20 aggreement, make ~~such adjustment~~ *adjustments* by general
21 rules, or by interim action pending such general rules, with
22 respect to ~~hours of operation~~ *the operation* of daytime
23 standard amplitude modulation broadcast stations, ~~as may~~
24 ~~be consistent with~~ *for purposes of permitting any such*
25 *station which may be adversely affected by the advancement*

1 *of time under the Uniform Time Act of 1966 to operate,*
2 *during the period such advancement of time is in effect, at*
3 *the greatest amount of power and during such extended*
4 *hours of operation as may be practicable and consistent with*
5 the public interest, including the public's interest in receiv-
6 ing interference-free service. Such general rules, or interim
7 action, may, *in addition,* include variances with respect to
8 ~~operating power and~~ other technical operating character-
9 istics. Subsequent to the adoption of such general rules, they
10 may be varied with respect to particular stations and areas
11 because of the exigencies in each case.

12 SEC. 6. The amendments made by section 3 of this Act
13 shall take effect on the third Sunday of March occurring
14 after the date of enactment of this Act.

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# EMERGENCY DAYLIGHT SAVING TIME LEGISLATION

Public Law 93-182
93rd Congress, H. R. 11324
December 15, 1973

## An Act

**To provide for daylight saving time on a year-round basis for a two-year trial period, and to require the Federal Communications Commission to permit certain daytime broadcast stations to operate before local sunrise.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That this Act may be cited as the "Emergency Daylight Saving Time Energy Conservation Act of 1973". Emergency Daylight Saving Time Energy Conservation Act of 1973.

SEC. 2. The Congress hereby finds and declares—

(1) that the United States faces severe energy shortages, especially in the winter of 1973–1974 and in the next several winters thereafter;

(2) that various studies of governmental and nongovernmental agencies indicate that year-round daylight saving time would produce an energy saving in electrical power consumption;

(3) that daylight saving time may yield energy savings in other areas besides electrical power consumption;

(4) that year-round daylight saving time could serve as an incentive for further energy conservation by individuals, companies, and the various governmental entities at all levels of government, and that such energy conservation efforts could lead 87 STAT. 707
to greatly expanded energy savings and help meet the projected 87 STAT. 708
energy shortages, and that such energy conservation efforts could include but not be limited to such actions as—

(A) lowering office, home, and store thermostats several degrees;

(B) limiting unnecessary automobile travel and holding down the speed of necessary automobile travel;

(C) using energy efficient automobiles;

(D) using public transportation whenever possible;

(E) turning off office air-conditioners and heating plants an hour earlier in the afternoon; and

(F) limiting unnecessary use of electric lights;

(5) that the use of year-round daylight saving time could have other beneficial effects on the public interest, including the reduction of crime, improved traffic safety, more daylight outdoor playtime for the children and youth of our Nation, greater utilization of parks and recreation areas, expanded economic opportunity through extension of daylight hours to peak shopping hours and through extension of domestic office hours to periods of greater overlap with the European Economic Community; and

(6) that the emergency nature of an energy shortage require the temporary enactment of daylight saving time.

80 Stat. 107.
40 Stat. 450;
42 Stat. 1434;
41 Stat. 446.

SEC. 3. (a) Notwithstanding the provisions of section 3(a) of the Uniform Time Act of 1966 (15 U.S.C. 260a(a)), the standard of time of each zone established by the Act of March 19, 1918 (15 U.S.C. 261-264), as modified by the Act of March 4, 1921 (15 U.S.C. 265), shall be advanced one hour and such time as so advanced shall for the purposes of such Act of March 19, 1918, as so modified, be the standard time of each such zone; except that any State with parts thereof in more than one time zone, and any State that lies entirely within one time zone and is not contiguous to any other State, may by law exempt the entire area of the State lying within one time zone from the provisions of this subsection.

(b) Notwithstanding any other provision of law, if a State, by proclamation of its Governor, makes a finding prior to the effective date of this Act, that an exemption from the operation of subsection (a) or a realinement of time zone limits is necessary to avoid undue hardship or to conserve fuel in such State or part thereof, the President or his designee may grant an exemption or realinement to such State.

80 Stat. 107;
86 Stat. 116.
15 USC 260.

(c) Any law in effect on October 27, 1973, adopted pursuant to section 3(a)(2) of the Uniform Time Act of 1966 by a State with parts thereof in more than one time zone, or adopted pursuant to section 3(a)(1) of such Act by a State that lies entirely within one time zone and is not contiguous to any other State, shall be held and considered to remain in effect as the exercise by that State of the exemption permitted by subsection (a) of this section unless that State, by law, provides that such exemption shall not apply during the effective period of this Act.

80 Stat. 109.
15 USC 267.

(d) The provisions of subsections (b) and (c) of section 3 and section 7 of the Uniform Time Act of 1966 shall apply to the provisions of this section.

Reports to Congress.
87 STAT. 708
87 STAT. 709

SEC. 4. (a) The Secretary of Transportation shall, on or before June 30, 1974, submit an interim report, and on or before June 30, 1975, submit a final report, to the Congress on the operation and effects of this Act. Each such report shall give particular attention to such effects on the use of energy in the United States, traffic safety, including the safety of children traveling to and from school, and the effect on school hours. Each such report shall also include such recommendations for legislation or other action as the Secretary may determine. The final report shall include any recommendations of the Secretary with respect to time zone limits.

(b) The Secretary of Transportation shall consult with the departments, agencies, and instrumentalities of the United States having information or expertise with respect to the operation and effects of this Act. Each such department, agency, and instrumentality shall exercise its powers, duties, and functions in such manner as will assist in carrying out the provisions of this section.

40 Stat. 450;
80 Stat. 108.

SEC. 5. The authority of the Secretary of Transportation, under the first section of the Act of March 19, 1918 (15 U.S.C. 261), to modify the limits of any time zone is suspended during the effective period of this Act.

SEC. 6. Notwithstanding any other law or any regulation issued under any such law, the Federal Communication Commission shall, consistent with any existing treaty or other agreement, make such adjustment by general rules, or by interim action pending such general rules, with respect to hours of operation of daytime standard amplitude modulation broadcast stations, as may be consistent with the public interest, including the public's interest in receiving interference-free service. Such general rules, or interim action, may include variances with respect to operating power and other technical operating characteristics. Subsequent to the adoption of such general rules, they may be varied with respect to particular stations and areas because of the exigencies in each case.

SEC. 7. This Act shall take effect at 2 o'clock antemeridian on the fourth Sunday which occurs after the date of enactment of this Act and shall terminate at 2 o'clock antemeridian on the last Sunday of April 1975. Effective date.

Approved December 15, 1973.

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LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-643 (Comm. on Interstate and Foreign Commerce).
SENATE REPORT No. 93-504 accompanying S. 2702 (Comm. on Commerce).
CONGRESSIONAL RECORD, Vol. 119 (1973):
Nov. 27, considered and passed House.
Dec. 4, considered and passed Senate, amended, in lieu of S. 2702.
Dec. 14, House and Senate agreed to conference report.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 9, No. 50:
Dec. 15, Presidential statement.

# EMERGENCY DAYLIGHT SAVING TIME LEGISLATION

Public Law 93-434
93rd Congress, H. R. 16102
October 5, 1974

## An Act

88 STAT. 1209

To amend the Emergency Daylight Saving Time Energy Conservation Act of 1973 to exempt from its provisions the period from the last Sunday in October, 1974, through the last Sunday in February, 1975.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section 3 of the Emergency Daylight Saving Time Energy Conservation Act of 1973 is amended—

Emergency Daylight Saving Time Energy Conservation Act of 1973, amendments. 15 USC 260a note.

(1) by inserting immediately after "(15 U.S.C. 260a(a))," in subsection (a) the following "and except as provided in subsection (e) of this section,"; and

(2) by adding at the end thereof the following subsection:

"(e) During the period commencing at 2 o'clock antemeridian on the last Sunday of October 1974, and ending at 2 o'clock antemeridian on the last Sunday of February 1975, the standard time of each zone established by the Act of March 19, 1918 (15 U.S.C. 261–264), as modified by the Act of March 4, 1921 (15 U.S.C. 265), shall be the standard time of each such zone pursuant to such Act of March 19, 1918, as so modified."

SEC. 2. Section 4(a) of the Emergency Daylight Saving Time Energy Conservation Act of 1973 is amended by striking out "June 30, 1975" and inserting in lieu thereof "July 31, 1975".

Approved October 5, 1974.

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LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-1287 (Comm. on Interstate and Foreign Commerce).
SENATE REPORT No. 93-1162 (Comm. on Commerce).
CONGRESSIONAL RECORD, Vol. 120 (1974):
Aug. 19, considered and passed House.
Sept. 26, 30, considered and passed Senate.

## UNIFORM TIME ACT OF 1966[1]

### Public Law 89–387, April 13, 1966; 80 Stat. 107

AN ACT To promote the observance of a uniform system of times throughout the United States.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That this Act may be cited as the "Uniform Time Act of 1966".

SEC. 2. It is the policy of the United States to promote the adoption and observance of uniform time within the standard time zones prescribed by the Act entitled "An Act to save daylight and to provide standard time for the United States", approved March 19, 1918 (40 Stat. 450; 15 U.S.C. 261–264), as modified by the Act entitled "An Act to transfer the Panhandle and Plains section of Texas and Oklahoma to the United States standard central time zone", approved March 4, 1921 (41 Stat. 1446; 15 U.S.C. 265). To this end the Secretary of Transportation is authorized and directed to foster and promote widespread and uniform adoption and observance of the same standard of time within and throughout each such standard time zone.[2]

SEC. 3. (a) During the period commencing at 2 o'clock antemeridian on the last Sunday of April of each year and ending at 2 o'clock antemeridian on the last Sunday of October of each year, the standard time of each zone established by the Act of March 19, 1918 (15 U.S.C. 261–264), as modified by the Act of March 4, 1921 (15 U.S.C. 265), shall be advanced one hour and such time as so advanced shall for the purposes of such Act of March 19, 1918, as so modified, be the standard time of such zone during such period; however, (1) any State that lies entirely within one time zone may by law exempt itself from the provisions of this subsection providing for the advancement of time, but only if that law provides that the entire State (including all political subdivisions thereof) shall observe the standard time otherwise applicable during that period, and (2) any State with parts thereof in more than one time zone may by law exempt either the entire State as provided in (1) or may exempt the entire area of the State lying within any time zone.

(b) It is hereby declared that it is the express intent of Congress by this section to supersede any and all laws of the States or political subdivisions thereof insofar as they may now or hereafter provide for advances in time or changeover dates different from those specified in this section.

(c) For any violation of the provisions of this section the Secretary of Transportation or its duly authorized agent may apply to the district court of the United States for the district in which such violation occurs for the enforcement of this section; and such court shall have jurisdiction to enforce obedience thereto by writ of injunction or by

[1] This Act is codified in sections 260, 260,a 266, and 267 of title 15, United States Code, and amended sections codified in sections 261, 262, and 263 of such title.
[2] 15 U.S.C. 260.

other process, mandatory or otherwise, restraining against further violations of this section and enjoining obedience thereto.[3]

SEC. 4. (a) [This subsection rewrote the first section of the Act of March 19, 1918, and is printed as a part of that Act. See below.]

(b) [This subsection rewrote section 2 of the Act of March 19, 1918, and is printed as a part of that Act. See below.]

(c) [This subsection rewrote section 4 of the Act of March 19, 1918, and is printed as a part of that Act. See below.]

SEC. 5. The Administrative Procedure Act (5 U.S.C. 1001–1011) shall apply to all proceedings under this Act, the Act of March 19, 1918 (15 U.S.C. 261–264), and the Act of March 4, 1921 (15 U.S.C. 265).[4]

SEC. 6. This Act shall take effect on April 1, 1967; except that if any State, the District of Columbia, the Commonwealth of Puerto Rico, or any possession of the United States, or any political subdivision thereof, observes daylight saving time in the year 1966, such time shall advance the standard time otherwise applicable in such place by one hour and shall commence at 2 o'clock antemeridian on the last Sunday in April of the year 1966 and shall end at 2 o'clock antemeridian on the last Sunday in October of the year 1966.[5]

SEC. 7. As used in this Act, the term "State" includes the District of Columbia, the Commonwealth of Puerto Rico, or any possession of the United States.[6]

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[3] 15 U.S.C. 260a. The language after the semicolon which appears in the text of subsection (a) was added by the Act of March 30, 1972 (P.L. 92-267; 86 Stat. 116).

[4] 15 U.S.C. 266.

[5] This section, which establishes the effective date of the Act, was not codified.

[6] 15 U.S.C. 267.

## ACT OF MARCH 19, 1918[1]

### Ch. 24, 40 Stat. 450

AN ACT To save daylight and to provide standard time for the United States

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That for the purpose of establishing the standard time of the United States, the territory of the United States shall be divided into eight zones in the manner provided in this section. Except as provided in section 3(a) of the Uniform Time Act of 1966, the standard time of the first zone shall be based on the mean solar time of the sixtieth degree of longitude west from Greenwich; that of the second zone on the seventy-fifth degree; that of the third zone on the ninetieth degree; that of the fourth zone on the one hundred and fifth degree; that of the fifth zone on the one hundred and twentieth degree; that of the sixth zone on the one hundred and thirty-fifth degree; that of the seventh zone on the one hundred and fiftieth degree; and that of the eighth zone on the one hundred and sixty-fifth degree. The limits of each zone shall be defined by an order of the Secretary of Transportation, having regard for the convenience of commerce and the existing junction points and division points of common carriers engaged in interstate or foreign commerce, and any such order may be modified from time to time. As used in this Act, the term "interstate or foreign commerce" means commerce between a State, the District of Columbia, the Commonwealth of Puerto Rico, or any possession of the United States and any place outside thereof.[2]

SEC. 2. Within the respective zones created under the authority of this Act the standard time of the zone shall insofar as practicable (as determined by the Secretary of Transportation) govern the movement of all common carriers engaged in interstate or foreign commerce. In all statutes, orders, rules, and regulations relating to the time of performance of any act by any officer or department of the United States, whether in the legislative, executive, or judicial branches of the Government, or relating to the time within which any rights shall accrue or determine, or within which any act shall or shall not be performed by any person subject to the jurisdiction of the United States, it shall be understood and intended that the time shall insofar as practicable (as determined by the Secretary of Transportation) be the United States standard time of the zone within which the act is to be performed.[3]

SEC. 3. In the division of territory, and in the definition of the limits of each zone, as hereinbefore provided, so much of the State of Idaho as lies south of the Salmon River, traversing the State from east to west near forty-five degrees thirty minutes latitude shall be embraced

[1] 15 U.S.C. 261-264.

[2] The language of the first section of the Act of March 19, 1918 (15 U.S.C. 261) which appears in the text was added by section 4(a) of the Uniform Time Act of 1966 (P.L. 89-387; 80 Stat. 108).

[3] The language of section 2 of the Act of March 19, 1918 (15 U.S.C. 262) which appears in the text was added by section 4(b) of the Uniform Time Act of 1966 (P.L. 89-387; 80 Stat. 108).

in third zone. *Provided,* That common carriers within such portion of the State of Idaho may conduct their operations on Pacific time.[4]

SEC. 4. The standard time of the first zone shall be known and designated as Atlantic standard time; that of the second zone shall be known and designated as eastern standard time; that of the third zone shall be known and designated as central standard time; that of the fourth zone shall be known and designated as mountain standard time; that of the fifth zone shall be known and designated as Pacific standard time; that of the sixth zone shall be known and designated as Yukon standard time; that of the seventh zone shall be known and designated as Alaska-Hawaii standard time; and that of the eighth zone shall be known and designated as Bering standard time.[5]

[4] The language of section 3 of the Act of March 19, 1918 (15 U.S.C. 264) which appears in the text was added by the Act of March 3, 1923 (42 Stat. 1434).

[5] The language of section 4 of the Act of March 19, 1918 (15 U.S.C. 263) which appears in the text was added by section 4(c) of the Uniform Time Act of 1966 (P.L. 89-387; 80 Stat. 108).

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# BACKGROUND INFORMATION AND SUBCOMMITTEE ANALYSIS OF BILLS BEFORE 94TH CONGRESS RELATING TO DAYLIGHT SAVING TIME

## I. The Standard Time System [1]

The system of standard time in use throughout the world today was formulated at the International Meridian Congress held in Washington, D.C., in October 1884. It is based on the theoretical division of the earth's surface into 24 zones. The standard time of each zone is the mean astronomical time of one of 24 meridians, 15 degrees apart, beginning at the Greenwich, England meridian and extending east and west around the globe to the International Dateline.

Established standards of time within the United States first came into use during 1883, the year preceding the International Meridian Congress. United States and Canadian railroads, at the General Time Convention in Chicago on October 11, 1883, and the Southern Time Convention in New York on October 17, 1883, adopted a four-zone system to govern their operations and reduce the confusion resulting from some 100 conflicting local sun times observed in terminals across the country. At noon on Sunday, November 18, 1883, the number of standards of time being observed by nearly all of the railroads in the United States and Canada were reduced to four (which we still recognize as eastern, central, mountain, and Pacific time). States and municipalities subsequently adopted one of the new zone standards for their own use by statute or ordinance, or, more usually, by public sentiment or habit. In most instances their decisions were influenced by the time used by the railroads. It was not long before every inhabited place in the nation was using one of the four-zone standards.

### THE STANDARD TIME ACT OF 1918

During World War I, agitation for "daylight saving," which had been successfully tried in Europe and which was advocated as a measure to conserve fuel and increase the national efficiency, led Congress to make time standards a matter of Federal legislation. The resulting Standard Time Act and the duties of the Interstate Commerce Commission under it rested on the Commerce clause and the Weights and Measures clause of the Constitution.

The act approved on March 19, 1918, was entitled "An act to save daylight and to provide standard time for the United States." It divided the territory of the continental United States into five zones; eastern, central, mountain, Pacific, and Alaska; and prescribed the

[1] This section consists mainly of excerpts from "Standard Time in the United States: A History of Standard and Daylight Saving Time in the United States and an Analysis of the Related Laws," published by the United States Department of Transportation (July 1970).

standard of time for each of those zones based on the mean astronomical time, respectively, of the 75th, 90th, 105th, 120th, and 150th degrees of longitude west from Greenwich.

The I.C.C. established permanent zone boundary limits and procedures for their modification on October 24, 1918. (51 I.C.C. 273).

### THE UNIFORM TIME ACT OF 1966

As early as 1948 the question of adopting a Federal "daylight saving time" statute with nationwide application was considered by Congress. Interest mounted, and during the 88th Congress (1964–1965) 14 separate bills on the subject were considered by Congressional Committees.

Ultimately, the 89th Congress enacted the Uniform Time Act of 1966 which amended and supplemented the 1918 act.

The 1966 act added several new standard time zones and changed the name of the original Alaska time zone. The new time zone plan provided for eight zones: (1) Atlantic, (2) eastern, (3) central, (4) mountain, (5) Pacific, (6) Yukon, (7) Alaska-Hawaii, and (8) Bering.

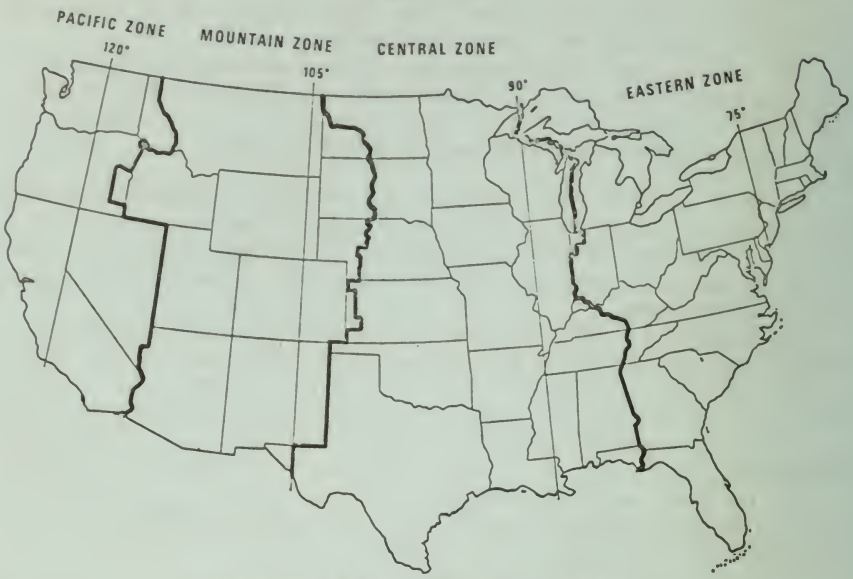
The resulting statutory scheme continued to vest in the I.C.C. the duty to define the limits of each of the statutorily identified time zones. A provision was added that authorized and directed the I.C.C. "*to foster and promote widespread and unifrom adoption and observance of the same standard of time within and throughout each . . . standard time zone.*"

Shortly after enactment of the Uniform Time Act the Department of Transportation was established, effective April 1, 1967, the same date on which the Uniform Time Act of 1966 became effective. Section 6(e) of the Department of Transportation Act transferred to and vested in the Secretary of Transportation all functions, powers, and duties of the Interstate Commerce Commission arising under both the 1918 Standard Time Act and the Uniform Time Act of 1966.

### PRESENT STANDARD TIME ZONES

The map below shows the present time zones in the conterminous United States. Approximately fifty changes in zone boundary location occurred between 1918 and 1975.

MAP NO. 1




**STANDARD TIME ZONE BOUNDARIES**

JANUARY, 1976

SOURCE: DoT MAP, 5th ed. 11/74

## II. ADVANCED TIME (DAYLIGHT SAVING TIME)

### A. SUMMARY

The United States used daylight saving time during both World Wars I and II, chiefly as a means of conserving electrical energy.[2] As early as 1948 adoption of a Federal daylight saving time statute with nationwide application was considered by Congress. The 89th Congress enacted the Uniform Time Act of 1966[3] which requires the observance of daylight saving or advanced time between the last Sunday in April and the last Sunday in October. It is interesting to note that the statute speaks not of daylight saving time, but of advanced time, for the reason that daylight saving time or DST is actually the advancement of standard time by one hour.

The 1966 Act supersedes any State and local laws to the contrary. However, any State may enact its own law exempting the entire State from the observance of advanced standard time. In 1972, an amendment was enacted providing that any State divided by a time zone boundary may exempt by law the entire area of the State lying within one time zone from the observance of advanced time.[4]

As a result of the energy crisis in the United States in late 1973, the Congress enacted the "Emergency Daylight Saving Time Energy

---

[2] An act to save daylight and to provide standard time for the United States, March 19, 1918; Act of January 20, 1942, ch. 7, 56 Stat. 9; terminated by Act of September 25, 1945, ch. 388, 59 Stat. 537.

[3] Uniform Time Act of 1966, Public Law 89-387, April 13, 1966; 80 Stat. 107. This Act is codified in sections 260, 260a, 266, and 267 of title 15, United States Code, and amended sections codified in sections 261, 262, and 263 of such title.

[4] 15 U.S.C. 260a.

Conservation Act" which placed the nation on year-round daylight saving time for a two-year period (Public Law 93–182). The purpose was to conserve energy, promote voluntary conservation by the public, and achieve other beneficial effects including reduction of crime and improved traffic safety. The Department of Transportation, which administered the Act, was directed to submit to Congress interim and final reports on the operation and effects of the legislation.

The Interim Report from the Secretary of Transportation indicated a probable reduction in the consumption of electrical energy of between .75 and 1 percent during the months of January through April 1974; however, the findings were, for the most part, inconclusive due to other factors affecting energy consumption at that time.

An increase in school children fatalities between 6 and 9 AM was noted, although an offsetting decrease during the remainder of the day was also indicated.

Public opinion was against a continuation of DST during the winter months of 1974–75. The Secretary of Transportation recommended that the United States be placed on standard time from November 1974 through most of February 1975. Congress approved this change to the emergency legislation and Public Law 93–434 was enacted on October 5, 1974.

When the emergency legislation expired on the last Sunday in April 1975, the Uniform Time Act of 1966 became the federal law, once again placing the United States on daylight saving time from the last Sunday in April to the last Sunday in October, a six-month period.[5]

The DOT final report to Congress in July 1975 stated that "modest overall benefits might be realized by a shift from the historic six-month DST system (May through October) to an eight-month DST system (March through October) in the areas of energy conservation, overall traffic safety and reduced violent crime."[6] The DOT also stated that these potential benefits were small and difficult to isolate from the larger effects of seasonal variations and of changes in energy availability and prices. The DOT recognized that their findings were not conclusive, but recommended another two-year trial period with eight months of DST to permit further analysis and more effective measurement of public acceptance and response.

### B. ADVANCED OR DAYLIGHT SAVING TIME LEGISLATION [7]

*National daylight saving time, 1918–19*

The 1918 act originally provided for daylight saving time on a national basis from 2:00 a.m. on the last Sunday in March to 2:00 a.m. on the last Sunday in October of each year. Since it was impracticable for the I.C.C. to define the limits of the zones during the few days intervening between the passage of the act and the day prescribed in

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[5] According to the Department of Transportation, the States which currently exempt themselves from the observance of advanced cr daylight saving time are: Arizona, 80 counties of Indiana, Hawaii, Puerto Rico, Virgin Islands, and American Samoa.

[6] Letter of July 29, 1975 from the Honorable William J. Coleman, Jr., Secretary of Transportation to the Honorable Carl Albert, Speaker of the House of Representatives, transmitting to the Congress the Final Report on the Operation and Effects of Daylight Saving Time. [Hereafter cited as DOT Final Report to Congress.]

[7] This section consists mainly of excerpts from "Standard Time in the United States: A History of Standard and Daylight Saving Time in the United States and an Analysis of the Related Laws," published by the United States Department of Transportation (July 1970).

the new act for the commencement of daylight saving, daylight time for the summer of 1918 was based on I.C.C.'s interim order, which merely defined each of the first four zones as embracing the points and areas that were already observing the time of that particular zone. In 1919 daylight saving was applied to the standard time of the respective zones as defined by the order of the I.C.C. that revised and adjusted the zone boundaries on a permanent basis. The repeal of the daylight saving provision took effect at the close of the 1919 daylight saving period. Under this original provision national daylight saving was observed from March 31 to October 27, 1918, and from March 30 to October 26, 1919.

*Local daylight saving, 1920–42*

Although there was no national daylight saving time from 1920 to 1942, individual States and municipalities, led by Massachusetts and New York City, acting by statute or local ordinance, provided for turning the clocks ahead in the spring and back again in the fall. In 1921, Chicago joined the growing list, and by 1923 the practice had spread throughout the East and Middle West. Thereafter strong opposition developed in certain sections with the result that there was considerable shifting back and forth from one standard to the other.

By the summer of 1941, daylight saving had grown to such an extent that it was generally observed throughout the New England States, by numerous municipalities in New York, Pennsylvania, New Jersey, Delaware, Illinois, and Indiana, and scattered points in Virginia, West Virginia, Florida, Kentucky, Tennessee, and the Upper Peninsula of Michigan. In July of that year, at the request of Federal authorities, the States of North Carolina and Mississippi, and additional portions of Kentucky, Tennessee, and Virginia, went on daylight saving time to combat the power shortage resulting from drought in the South.

*National "War Time," 1942–45*

At the outbreak of World War II, nationwide daylight saving was again urged as a defense measure and, after our entry into the war, Congress enacted a law which advanced the standard time of each zone by 1 hour, effective February 9, 1942.[8] Unlike its 1918 counterpart, which was confined to the 7 warmer months, this second enactment of national daylight saving applied throughout the entire year to assist in dissipating evening peaks in the nation's electrical power consumption, which were threatening to exceed the capacity available for nondefense purposes, and which were even greater in winter than in summer months. Congress did not designate an official name for this year-round advanced time. However, at President Roosevelt's suggestion it was called "War Time."

The change to "War Time" early in 1942 eliminated, for the duration of the war, the local observance of daylight saving usually encountered in the East. There was some talk about the possibility of "double daylight time" on an individual State or community basis during the summers, but it never received much support on this side of the Atlantic. When the war ended, one of the first measures to restore normalcy was the repeal of "War Time", effective September 30, 1945.[9]

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[8] Act of January 20, 1942 ch. 7, 56 Stat. 9.
[9] Act of September 25, 1945 ch. 388, 59 Stat. 537.

*Local Daylight Saving Between 1945 and 1966*

With the end of "War Time" there was the usual recurrence of the annual shift to local daylight saving time by the States and municipalities which had observed the practice prior to the war. New adherents had developed in other States and communities throughout the country. Faced with a threatened power shortage in 1948, the Governor of California advanced the standard of time for that State by one hour, and one of the railroads serving the State observed the advanced standard in its time schedules governing the operation of all its trains in the State. It was not long before Nevada and other Pacific coast areas joined the growing trend to daylight saving. By the summer of 1961 daylight saving had spread to areas with a total population of about 102 million comprising all or parts of 27 States and the District of Columbia. Many of these States provided for statewide observance of daylight saving time by law. The District of Columbia law was, of course, enacted by Congress.

The confusion attending the annual change from standard to daylight time and back again at some points or areas while other maintained standard time was aggravated by the wide differences in length between the daylight saving period observed in different places. The length of time provided in the 1918 act had been approximately 7 months (from the last Sunday in March to the last Sunday in October). Later, when daylight saving was observed on a local basis, a 5-month period, from the last Sunday in April to the last Sunday in September, was the most popular. Many places, though, insisted on their own individual daylight saving periods resulting in differences ranging from a day or so to a month or more. Beginning in 1954, in New England, the daylight saving period was extended for about a month into the fall. By 1966 a 6-month period, from the last Sunday in April to the last Sunday in October, was generally followed in the eastern and several midwestern States, although some States and communities which observed daylight time continued to use a different period.

*Advanced Time Under the Uniform Time Act of 1966*

Within the zones as defined by the I.C.C., the 1966 act requires the observance of advanced time between the last Sunday in April and the last Sunday in October. Any State and local laws to the contrary are superseded. It does, however, provide that any State may, by law, exempt the entire State from the observance of advanced standard time. In 1972, the Act was amended by Public Law 92–267 so as to give any State divided by a time zone boundary the additional option, of, by law, exempting the entire area of the State lying within one time zone from the observance of advanced time.

Under the 1966 act the I.C.C. was authorized to apply to the United States district courts for injunctive, or other appropriate relief, in the event of violation of the act's advanced time provisions.

It is interesting to note that the term "daylight saving" is not used in the 1966 act. Instead it requires that "the standard time of each zone . . . shall be advanced [during the prescribed period] and such time as so advanced shall be the standard time of such zone during such period". Therefore, the time we now observe each summer is not "daylight" or "daylight saving" time but is "standard" time (advanced).

*Emergency Daylight Saving Time Energy Conservation Act*

In November 1973 the full Interstate and Foreign Commerce Committee held hearings on emergency legislation related to the energy crisis. As the result of House and Senate passage of bills to require the observance of daylight saving time on a year-round basis for two years, Public Law No. 93–182 was enacted on December 15, 1973, effective on January 6, 1974 and terminating on the last Sunday in April 1975.

At the time of the hearings on this emergency legislation, the Administration believed that year-round daylight saving time could reduce electricity and heating demands by as much as three percent. It was also asserted that automobile accidents and street crime would be reduced and that the added daylight in the early evening hours would give the public greater opportunity for recreation and shopping.

However, the Congress recognized that there would be problems. Particularly in the western portion of the various time zones, some children would be going to school in early morning darkness with the attendant safety problem. Daytime AM/FM radio broadcasters which operate from sunup to sundown also would have a problem. As the FCC pointed out, the problem of the 500 daytime broadcast stations which operate on clear channels by treaty arrangements between Canada, Mexico, and the U.S. are virtually insoluble. Due to these treaties, these stations often cannot operate prior to sunrise with enough power to serve their areas. The valuable "drive time" when persons drive to work in the early morning hours is lost. Not only does this reduce income to these radio stations, it deprives an area of necessary weather and local information.

Due to public concern about year-round DST, particularly the concern about children going to school in early morning darkness, Congress amended the emergency DST law to provide four months of standard time from November 1974 through February 1975. (Public Law No. 93–434).)

The Department of Transportation was directed by the emergency DST legislation to submit interim and final reports to Congress on the operation and effects of the Emergency Daylight Saving Time Energy Conservation Act. The DOT final report to Congress in July 1975 stated that "modest overall benefits might be realized by a shift from the historic six-month DST system (May through October) to an eight-month DST system (March through October) in areas of energy conservation, overall traffic safety and reduced violent crime." The DOT also stated that these potential benefits were small and difficult to isolate from the larger effects of seasonal variations and of changes in energy availability and prices. The DOT recognized that their findings were not conclusive, but recommended another two-year trial period with eight months of DST to permit further analysis and more effective measurement of public acceptance and response.

Prior to hearings in the House of Representatives in the 94th Congress on bills to alter the period for observance of daylight saving time, the Subcommittee on Transportation and Commerce decided to obtain the broadest range of views possible on the wisdom of changing the DST period once more. Many bills had been introduced in the House recommending DST periods ranging from three to twelve months. All the House bills propose a permanent change in the DST period. For this reason, the Chairman of the Subcommittee on Transportation and Commerce requested a technical evaluation of the

DOT Final Report from the National Bureau of Standards with attention directed to four areas: the regional effects of proposed daylight saving time periods; the statistical treatment of school-age children fatal accidents; a review of the DOT analysis of fatal motor vehicle accidents; and a review of the DOT calculation for electricity savings. The Subcommittee Chairman introduced two bills for consideration by the Subcommittee. They were designed to accommodate the concerns of the public regarding the safety of school children and the effects of late sunrises on various regions of the nation. These bills are H.R. 13089, proposing a seven-month DST period from the third Sunday in March to the third Sunday in October; and H.R. 13090, proposing a six-month DST period from the first Sunday in April to the last Sunday in September.

In this Congressional session the Senate enacted a bill, S. 2931, on February 25, 1976 to conduct another two-year trial using a seven-month DST period beginning on the second Sunday in March and ending on the second Sunday in October.

The Subcommittee on Transportation and Commerce of the Interstate and Foreign Commerce Committee held hearings on the House bills and the Senate-passed bill on June 8 and 9, 1976. Testimony was presented by the Department of Transportation, the National Bureau of Standards, transportation and travel organizations, a representative of the City of Los Angeles, and the Daytime Broadcasters Association. On June 29, 1976 the Subcommittee ordered reported the bill, H.R. 13089, which would change permanently the period for observance of daylight saving time to seven months, the period beginning on the third Sunday in March and ending on the third Sunday in October.

## III. Consideration for Advanced or Daylight Saving Time Periods

### A. ASTRONOMICAL AND GEOGRAPHIC [10]

A standard time zone region is one in which all the clocks show the same time. A direct consequence is that those people living in the eastern portion of the region will experience sunrises and sunsets earlier (by the clock) than those living in the western portion of the region. This phenomenon occurs in each of the 24 time zones around the world, and, in particular, in each of the 4 times zones established in the conterminous United States.

In theory, the greatest difference in (clock) sunrises and sunsets for any time zone should be 60 minutes—30 minutes earlier at the eastern edge of the time zone, than the defining time at the zone center (the Standard Meridian), to 30 minutes later at the western edge of the zone. In practice, the time zones are not symmetric, and for the United States zones, taken as a group, the range is 32 minutes earlier to 60 minutes later than the defining time. Those regions in the time zones which are more than 30 minutes from the Standard Meridian are shown on Map No. 2. Since the people in the western portion of the zones always experience later (clock) sunrise times than those in the

[10] For additional information, see sections 1 and 2 of "Review and Technical Evaluation of the DOT Daylight Saving Time Study," prepared for Chairman, Subcommittee on Transportation and Commerce, Committee on Interstate and Foreign Commerce, House of Representatives, by the National Bureau of Standards, April, 1976. This information is determined from known astronomical tables from the U.S. Naval Observatory and demographic data from the Bureau of Census.

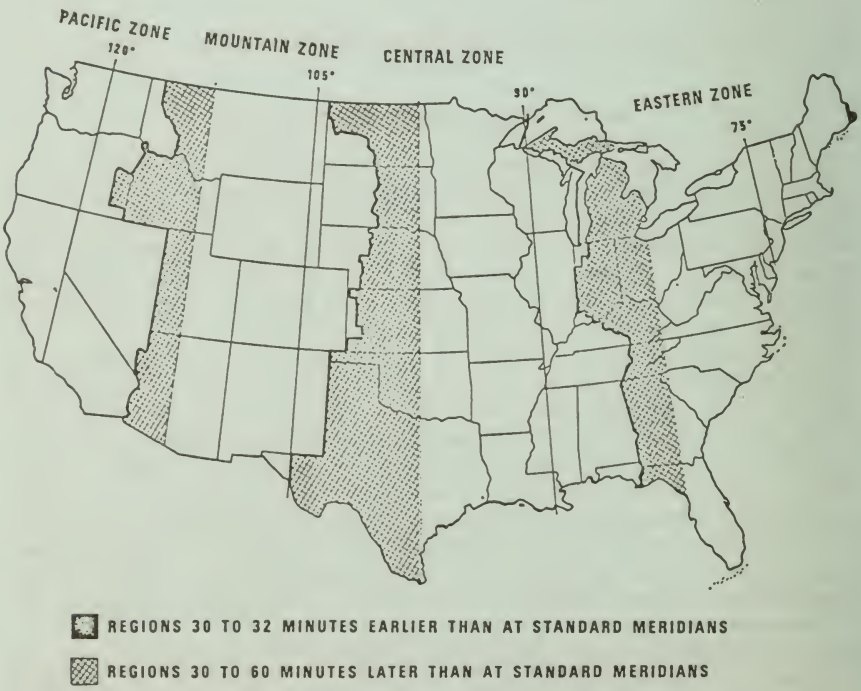
eastern portion, they will necessarily experience the greatest difficulty with late sunrises under any daylight saving time period (which advances the clocks in the zone by one hour).

United States population throughout the four time zones is important in considering the effects of any DST period. More than 34 million people live at least 30 minutes west of the Standard Meridians; this is 17.1 per cent of the total population. Most of these people reside either in the Eastern Time Zone (27.28 million) or in the Central Time Zone (6.56 million). There is no Pacific Zone population in this group.

In addition to this east-to-west effect just discussed, which is caused by the adoption of standard time zones, there is a north-to-south effect caused by the tilt of the earth's axis. This second effect varies as the earth moves around the sun (e.g., in January sunrise is 70 minutes later in the north than in the south; in mid-June, sunrise is 75 minutes earlier in the north than in the south). The impact of this effect is felt more in the southern regions of the United States than in the northern regions for any daylight saving time period, and increases in impact as the DST time period is made longer.

One way to show this effect is to consider various DST periods. A comparison can be made by examining those DST periods which would lead to no sunrises later than the latest (winter) standard time sunrises. Only those DST periods which begin and end between April 6 and September 18 satisfy this condition. Any longer DST period results in days with sunrises later than in winter. Map No. 3 shows the impact by region for a particular 8-month DST period.

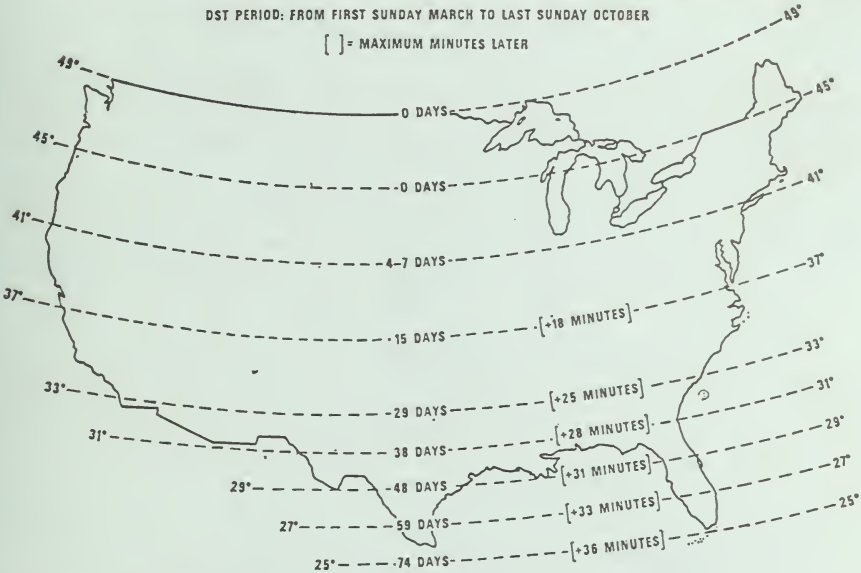
Map No. 2




Source: NBS Evaluation

Map No. 3

**DAYS HAVING SUNRISE LATER THAN LATEST STANDARD TIME SUNRISE**




Source: NBS Evaluation

The north-south and east-west variations can be taken into account together. One way to consider them is to examine the actual (clock) sunrise times and require that no sunrise, under DST, occur after some particular time. The table below, valid for about 99 percent of the population in the conterminous United States, relates various various sunrise times with the DST periods.

TABLE 1.—DST PERIODS ASSOCIATED WITH DST (CLOCK) SUNRISE TIMES

| Latest DST sunrise tolerable | Dates for DST span | Months of DST |
|---|---|---|
| None after: | | |
| 8:45 a.m. | Feb. 20–Nov. 9 | 8.6 |
| 8:30 a.m. | Feb. 28–Oct. 31 | 8.0 |
| 8:15 a.m. | Mar. 7–Oct. 21 | 7.5 |
| 8 a.m. | Mar. 15–Oct. 11 | 6.9 |
| 7:45 a.m. | Mar. 24–Oct. 1 | 6.3 |
| 7:30 a.m. | Apr. 5–Sept. 16 | 5.4 |
| 7:15 a.m. | Apr. 18–Aug. 20 | 4.1 |
| 7 a.m. | May 2–July 29 | 2.9 |

Source: NBS evaluation, at p. 39.

Although a primary concern of Congress has been the problems associated with late sunrises, later sunsets, especially in the autumn period, are desired by many people. It is possible to consider clock sunrises and sunsets together. The findings are that certain months are comparable, namely April and September, and March and October. In addition, when one examines possible DST months solely on the basis of the amount of daylight available, the problem is a "tradeoff" between late sunrises and early sunsets for March and October.

Using neither month would give a six-month period (April through September); using parts or all of these two months would lead to 7 or 8 months of daylight saving time.

### B. ENERGY SAVINGS

A primary reason for the enactment of the emergency DST legislation in 1973 (Public Law 93–182) was the possibility that extended daylight saving time periods would produce energy savings. The Congressional findings in this legislation stated:

> That various studies of governmental and nongovernmental agencies indicate that year-round daylight saving time would produce an energy saving in electrical power consumption;
>
> That daylight saving time may yield energy savings in other areas besides electrical power consumption. (Sec. 2(2) and (3), P.L. 93-182).

The issues considered in the experiments were the existence of a savings in energy and its magnitude. Three areas were considered: possible electricity savings, possible savings in home heating fuels, and changes in gasoline consumption. It was recognized at the outset that many energy uses—industrial operations, for example—would not be affected by time changes on clocks.

*1. Electricity*

The DOT utilized hourly electric load data from 14 electric utilities across the country. By analyzing the data associated with electricity demand before and after clock changes in October (1973 and 1974), in April (1973) and in January (1974), they inferred that "daylight saving time results in probable electricity savings of 1 percent in March and April."

The NBS, using the same set of data, concluded:

> The DOT data base, derived from hourly electricity-load records of 14 power companies (producing approximately ⅓ of the Nation's electrical energy), was found faulty in several respects, and corrections were required.
>
> Applying the analyses used by DOT to the corrected data base, NBS finds no conclusive evidence for decreased production of electrical energy during Daylight Saving Time (DST).
>
> Results from equivalent-day normalization (a technique used by DOT to compare electrical loads between DST and Standard Time periods) were found to be highly sensitive to the choice of morning and evening periods considered to show the influence of DST.

In testimony, the DOT disagreed with NBS's evaluation, particularly with criticism of the DOT use of the equivalent-day normalization technique.

The issue is not resolved. The DOT position remains:

> (1) There is a saving in electricity usage due to DST at DST transitions, and
>
> "(2) The magnitude of the DST saving is about 1 percent.

The NBS position is:

> NBS warns that the particular figures calculated for the increases or decreases cannot be simply interpreted as (DST effects.)

Gross electricity production data, without detailed corrections for known influencing factors and trends (temperature, sky cover, etc.) are not sufficient for assessing size or direction of a possible DST-related effect on electricity consumption.

*2. Home Heating*

The DOT indicated a saving of less than 0.1% and that a maximum saving of 3000 barrels of oil and the equivalent of 5000 barrels of natural gas per day might occur in south and southwestern states only. DOT indicated in testimony that there were no data available to them to perform an analysis, and the conclusions were based upon hypothetical models. They felt there would be no substantial DST effect upon heating.

Well after the time period of the DOT study, an article entitled "Winter Daylight Saving Time: Space Heat Wasted" appeared in the Journal of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. The author, a retired engineer, concluded that daylight saving time during the months of November through March increased fuel consumption, stating:

> Wasted fuel oil during the 1973–74 heating season by the added space heating load forced by daylight saving time totaled between 8.4 to 30.7 million barrels.

The author's conclusion is based on a mathematical model which uses National Weather Service morning and evening temperature data for U.S. regions. He provides data which show that changes in residential gas use are consistent with his model. The amount of data considered is very small.

The issue of increased fuel use, rather than fuel savings, during November through March (and possibly October) caused by DST is an open question at present.

*3. Gasoline Consumption*

The DOT was not able to determine changes in gasoline consumption. They estimated their techniques would not be able to detect a change of less than 0.5 per cent. This change would be an *increase* in gasoline consumption caused by DST.

In summary, the effects of DST upon energy consumption appear to be small. Some of the energy uses would apparently be decreased, others would apparently be increased by DST periods.

### C. MOTOR VEHICLE FATALITIES

The two issues considered were the effects of daylight saving time upon the safety of children traveling to and from school, and its effect upon traffic safety. The primary data base used to investigate these issues was the NHTSA (National Highway Transportation Safety Administration) Fatal Accident File, established in 1973, which covered the 18-month period from January 1, 1973 through June 30, 1974. It is designed to include all reported cases of fatal traffic accidents in the 50 states, the District of Columbia, and four territories.

*1. School children fatalities*

The DOT concluded in its final report:

> During the winter DST period in 1974, considerable apprehension was voiced by the people and by the Congress concerning

the safety of children going to school in morning darkness. The analysis reported here does not support these fears. Rather it has been discovered that in the morning schoolage children fatal accidents were not significantly different from fatal accidents in the total population, either during the January-April 1974 DST period or during the DST periods at the fall and spring transitions in 1973. Furthermore, in the comparison of January-April 1973 vs. 1974, no special hazard to children could be detected in the fatality data for pedestrians/pedalcyclists, motor vehicle occupants, and total accidents.[11]

At the request of the Chairman of the Subcommittee on Transportation and Commerce, the National Bureau of Standards (NBS) evaluated the DOT's analysis using the same data base. The statements made by NBS in its "Review and Technical Evaluation of the DOT Daylight Saving Time Study" [12] are:

The statement that "school-age children fatal accidents were not significantly different from fatal accidents in the total population" does not really answer the question about danger to children, since DST may have equally adverse effects on both children and adult fatalities in the morning. Thus fatalities in school-age children and the total population may both increase or both decrease, while school children fatalities as a percentage of the total could remain the same. Similarly, the finding that "no special hazard to children could be detected" does not alleviate the fear concerned with "the safety of children going to school in morning darkness."

In the analysis below, we focus on the question of children's safety when they have to go to school in darkness in the morning. (at pages 102–103).

NBS concluded:

(1) There was a statistically significant increase of school-age children fatalities in the morning during the four month period January-April 1974 as compared to the same period (non-DST) of 1973. Supplementary observations which tend to strengthen this conclusion because of their effects on the incidence of accidents include (a) the fact that 44 percent of school districts shifted school hours to later times, and (b) the reasonable expectation that more children were driven to schools during DST than during Standard Time periods. Nevertheless, this increase cannot be simply interpreted as a "DST effect," in view of the many other factors that influence traffic fatalities.

(2) There appears to be a decreasing trend in fatalities for pedestrians and pedalcyclists (as well as motor vehicle accidents) in general between 1973 and 1974, present for the midday, and in the evening. It is impossible to estimate with any certainty what part of the decrease is due to DST. Therefore, the total impact of DST on children fatalities cannot be assessed. (at pages 108–109).

Both NBS and DOT concluded there was no evidence for a statistically significantly increase in school children fatalities when the months of March and April were considered separately.

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[11] DOT Final Report to Congress, Vol. I, p. 87.
[12] Hereinafter cited as NBS Evaluation.

In testimony, the DOT indicated disagreement with the NBS evaluation, their position being that "reliable statistical inferences cannot be made by analyzing the child fatality population alone."

The NBS position remains:

> Given a set of data, we can analyze those data in a number of different ways depending upon what question is to be answered. Congress, in legislating DST, has always been worried about school children's safety when they have to go to school in darkness in the morning. This concern was shared by many of the witnesses in the 1973 and 1974 hearings. (NBS Evaluation, at page 102).

In addition to which question is important to Congress, there are other implications to consider. The first is the nature of the experiment. Information only for the beginning months of a year are available. Thus, if a concern exists for the months of January and February, then—on the basis of available light—the same concern exists for the months of November and December. (This type of reasoning was utilized by Congress-during its hearings which led to the enactment of Public Law 93–434 for the second year of the experiment.)

The second implication relates to statistical inference and the amount of available light. After considering the months of January through April separately, NBS indicated a statistically significant result for the months of January and February, but not for the months of March and April. If the effect is related to the amount of available light during these months, it is not possible to determine a safe starting date for DST from the NBS evaluation. This is because the amount of available light is increasing rapidly during the month of March. At its beginning, the month has the same number of daylight hours as the end of February, and at its end has the same number of hours as the beginning of April (An implication similar to this one for March holds for the month of October, where the amount of daylight is decreasing rapidly.)

*2. Total Motor Vehicle Fatalities*

The DOT concluded there were indications of an approximate 0.7% reduction in total motor vehicle fatalities during the months of March and April. This finding corresponds to an approximate saving of 50 lives and 2000 injuries for these two months. DOT believes these results are conservative and that further study may reveal reductions in fatalities of 1.5% to 2.0% due to DST. The basis for their analysis is as follows:

> After the nation goes on DST there is one hour more of darkness in the morning and one hour less in the evening. Hence, it is hypothesized that there should be an increase in morning fatal accidents and a decrease in evening fatal accidents. Because there are more fatal events in the evening, the transition to DST should produce a net decrease in the total number of fatal accidents.[13]

The DOT used mathematical techniques—Fourier Transform analysis and frequency filtering—to remove large trends in the fatality data file which would obscure any effects due to DST. Their conclusion is based upon the use of these techniques.

The NBS findings from its evaluation of the same data base were:

> The data base contains biases: The data are not fully comparable over the 18-month time span since a number of states did

[13] DOT Final Report to Congress, Vol. I, page 62.

not report consistently. Information needed to analyze the effects of DST upon total motor vehicle fatalities is incomplete in many cases.

Substantial parts of the data base can be used to investigate possible DST-effects upon total motor vehicle fatalities, with suitable caution about biases. In particular, a set of data for 25 states was identified that showed no obvious sources of bias.

A variety of statistical tests were applied to determine if any effect (however caused) on morning and evening fatalities could be detected in the DST transitions of April and October 1973 and January 1974. Only the January 1974 evening period showed a significant difference.

A number of statistical analyses were made to attempt to isolate a DST-related effect for the same periods. The January 1974 morning period showed a statistically significant effect—increased fatalities under DST. NBS warns again that increases and decreases during DST cannot be simply interpreted as "caused" by DST. Morning and evening periods in April and October 1973 showed no significant effect.

NBS performed a number of additional analyses employing a variety of statistical tests. No conclusive evidence was found for a DST-related decrease in fatalities (morning plus evening) during any of the three DST transitions. (NBS Evaluation, at pages E–4, E–5).

The DOT disagreed with the NBS findings, concluding there was "little basis for the NBS criticism of the DOT use of Fourier methods," and that "the NBS findings throw no light on the DST impacts . . . because of the different analytical methods they used to study these areas." The DOT indicated that their result "argues for the interpretation that the effect of biases [in the data base] is minimal."

The NBS position is as follows:

> . . . a major problem with the Fourier approach is that, due to its complexity, the effects of the now-known biases in the input data on the conclusions are virtually impossible to ascertain. (NBS Evaluation, at page 163).

Subsequent to the hearings, DOT and NBS analysts met to consider the potential for future studies on DST impacts. A general statement made by these analysts is germane to this issue:

> . . . it was agreed that further studies should make use of a *variety of complimentary analytical techniques* and take special care to estimate error bounds and confidence limits. Every effort should be made to ensure that data biases are known and accounted for in the analysis. [emphasis added]

### D. CRIME

During the 1974–75 experimental period, two studies of the impact of daylight saving time on crime were sponsored by the Law Enforcement Assistance Administration. One, a study of the relation of clock changes and crime in the city of Los Angeles, was too limited in data detail to perform reliable statistical tests.

The second study was based upon extensive data from the District of Columbia. The results were that periods of daylight saving time had consistently less crime than comparable periods of standard time.

For violent crime—homicide, rape (including attempts), robbery (including attempts), and aggravated assault—the decreases were 10–13 percent; for property crime—burglary, larceny, auto theft, and vandalism—the decreases were 2–9 percent. However, only the hourly pattern of violent crime showed a tendency to depend on the time of daylight, such tendency being a necessary component of any hypothesis relating crime levels to time changes.

The analysis for the District of Columbia are for the two-week periods before and after 5 time changes: April and October, 1973; January and October, 1974; and February, 1975. It is not known if the observed crime reductions are limited to these periods, or whether the reductions persist through the entire daylight saving time portion of the year.

Based upon these studies, the Department of Transportation suggested in their report that there is evidence of a 10 to 13 percent reduction in violent crime during March and April in Washington, D.C.

In its transmittal letter to the DOT, the Law Enforcement Assistance Administration stated:

> While these observations may appear to be impressive indications that violent crime is significantly reduced as a result of increased daylight [14] caused by the imposition of extended periods of daylight saving time periods, we would caution against any generalizations at this time. The data were analyzed only in one city and it is not known whether this reduction is transient or persists over longer periods of time.[15]

### E. DAYTIME STANDARD AM BROADCAST STATIONS

The hours of operation and operating power are established by rule by the Federal Communications Commission for the daytime standard AM broadcast stations. These radio stations operate from local sunrise to local sunset only. In 1973, when the emergency legislation was under consideration to require year-round observance of DST, the Chairman of the FCC urged an amendment to prevent the problem which the legislation would cause for certain daytime only AM radio broadcast stations. An amendment was adopted by this Committee requiring the FCC to permit, consistent with the public interest, these daytime AM radio broadcast stations to operate not more than one hour before local sunrise. This provision was enacted as section 6 of the Emergency Daylight Saving Time Energy Conservation Act.

One example will illustrate the essence of the daytime broadcasters' problem. A daytime only station presently permitted to begin operation at local sunrise, which we will assume to be 7:30 a.m. in midwinter, could not begin operation until 8:30 a.m. advanced time. Because the service of such stations is primarily geared to the commuting public, these stations would miss much of the morning "drive time" period. While they would gain an additional hour of operation just before sunset, there would be a loss of morning advertising revenue which might not be entirely recouped at the end of the day.

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[14] Note: It is not increased daylight, but shift in daylight hours.
[15] DOT Final Report to Congress, Vol. I, Appendix, p. 8.

The daytime only concept of broadcasting is firmly rooted in the FCC's allocations structure and reflects the physical facts that, with the coming of sunset we have the phenomenon of the building up of the ionosphere—from which radio signals are reflected back to earth at significantly greater distance than occurs with daytime transmission patterns. This "skywave" transmission also has the potential for causing interference to other stations at considerable distances. This phenomenon results in far greater numbers of stations authorized to operate during the daytime than can operate at night.

The foregoing technical characteristics have been recognized by international agreements to which the United States is a party. Thus, in accordance with the 1950 North American Regional Broadcasting Agreement (NARBA) and the U.S.-Mexican Standard Broadcasting Agreement, daytime only stations operate from local sunrise to local sunset.

In an attempt to permit additional early morning service, the United States has entered into supplemental agreements with Canada and Mexico to grant presunrise authorizations (PSA's) in certain instances. These PSA's generally permit a uniform year-round 6:00 a.m. sign-on with a power of 500 watts (or less when necessary to meet foreign protection requirements). Of the 2300 daytime only stations, 1,725 or 75 percent, have been issued presunrise authority.

The burdens imposed by any DST period with sunrises later than the latest winter sunrise would fall most heavily on the 575 daytime stations not presently holding PSA's. Of these 575 stations, 360 are ineligible for PSA's due to foreign station protection requirements; 130 are ineligible due to U.S. clear channel protection requirements; and 85 are non-holders by choice.

This Committee, in considering this matter at the time of the emergency DST legislation, had no intention of abrogating existing treaty obligations. But, with respect to the 130 stations ineligible for PSA's because they were on frequencies on which the United States has I–A or I–B clear channel priorities during the nighttime hours, the Committee added section 6 with the expectation that something could be done for these stations in their early morning operation.

The FCC's action pursuant to section 6 during 1974 and 1975 was outlined in a letter dated June 10, 1976 to the Chairman of the Subcommittee on Transportation and Commerce from the Honorable Richard E. Wiley, Chairman of the FCC. Excerpts are printed below:

> To mitigate these problems, section 6 of the Emergency DST Energy Conservation Act of 1973, P. L. 93–182, directed the Commission to adjust the hours of daytime to provide limited pre-sunrise operating authority where consistent with interference-free service and existing treaty obligations. While the emergency relief promulgated under such authority successfully bridged the standard-advanced time gap for the majority of standard broadcast stations, such relief remains unavailable or highly limited with repsect to approximately 500 daytime stations operating on U.S. and foreign clear channel frequencies. As secondary stations, they are either precluded from making DST adjustments in their sign-on times, or are forced to operate at lower power levels consistent with the protection requirements of dominant stations on the same channels.

When stations engineered for daytime operation and stations engineered separately for fulltime operation use the same frequency under pre-sunrise conditions, both interference and economic problems arise. If daytime stations are not permitted to recoup the hour lost to DST, many of their early morning listeners will have departed for work or school before licensed—i.e., actual sunrise—sign-on times. This could effectively deprive some communities of the only local early morning radio service available to them. The economic burdens imposed by the proposed legislation would fall most heavily on the approximately 500 daytime stations operating on U.S. and foreign clear channels, and particularly those located on the western edges of time zones. The economic study undertaken by the Commission last year revealed that resulting losses in early morning drive-time audiences and advertising revenues were not entirely recouped in the afternoon by the shift in daytime operation caused by DST.

### F. OTHER

The DOT Final Report summarized other effects of the emergency DST legislation as follows:

*Utilization of Parks and Recreation Areas.*—The Department of Interior reports that neither YRDST nor eight-month DST has any effect on its operation, including the utilization of parks and recreation areas.

*Labor.*—Consistent with their findings in the YRDST interim report, the Department of Labor reports no adverse effects of DST on working people.

*Agriculture.*—The Department of Agriculture reported that their findings remained unchanged from last year. DST does not affect agricultural activities or productivity. . . .

*Business Activity.*—Some 75 private organizations were solicited for opinions on the possible impacts of DST on such aspects of business activity as manufacturing, domestic trade and finance, foreign trade, construction, harbor operations and shipbuilding, and public transportation. In general DST effects were considered to be minimal . . . (DOT Final Report, at pages 113–114).

## IV. Future Experiments

The Department of Transportation stated that its findings of modest overall benefits were not conclusive but did support a recommendation for another two-year experiment using eight months of DST and four months of standard time. Further analysis of new data so obtained could lead to increased confidence in our knowledge of DST impacts.

Several DST periods now under consideration would also be suitable for further analysis—e.g., H.R. 13089 (7 months of DST) and H.R. 13090 (6 months)—so the issue becomes one of performing more experiments, rather than more experiments requiring a particular DST period.

In testimony, several groups voiced opposition to any more experiments, citing continuing confusion on the part of the general public, and the possible danger to time uniformity in the United States. These groups included members of the transportation industry, the communications industry, and the tourist industry.

During testimony, the NBS was asked if further experiments in the areas they analyzed would lead to greater confidence in the results. In agreement with DOT, they indicated the DST effects were small, and went on to suggest it would be difficult to obtain very clear-cut results from additional experiments.

Following the hearings, DOT and NBS analysts met to consider whether a common position could be developed on the potential of further studies to clarify the impacts of DST. Summary statements on particular impact areas are as follows:

### 1. ENERGY SAVINGS

In the area of total energy use, it was agreed that this would be the most costly and least conclusive of the three impact areas under consideration for further study. To date, DOT has been unable to obtain data on household heating fuel and gasoline consumption from other Federal agencies to analyze the net energy effects of DST. It was felt that in order to obtain an accurate picture of net DST energy effects careful studies of heating fuel and gasoline consumption would be needed to complement further analysis of electric lighting load consumption. It was also felt that such detailed studies could be very expensive since they might involve large-scale instrumentation of households and automobiles to accurately measure fuel use. It was agreed that further study in the area of electricity and other energy impact areas could improve the basis for public decision-making but less reliably than in the areas of motor vehicle fatalities and crime and at higher cost.

### 2. MOTOR VEHICLE FATALITIES

Improvement can be made in the reliability of our knowledge of the impacts of DST in the area of motor vehicle fatalities, including those of school children. An improved, automated data base will be available from NHTSA on motor vehicle fatalities. However, it is again unlikely that the results will be conclusive, although they would form a firmer basis for public decision-making than the current results. We would expect that at least four DST transitions in addition to the two that were analyzed in the studies to date would give us a clearer picture of the safety impact.

### 3. CRIME REDUCTION

NBS has not reviewed that portion of the DST report covering crime. Although it was agreed that LEAA should be the final arbiter of the potential of DST impact studies in the area of crime, it did appear to the DOT and NBS analysts that extension of the LEAA analysis from only 1 city to 5 or 10 cities might give us more confidence in our understanding of DST impacts on crime. It should be emphasized, however, that results may not be conclusive but may permit more informed public decision-making relative to DST and crime than can now be made. Furthermore, if the Washington, D.C. results (reported by LEAA) of 10–13% reductions in outdoor violent crime prove to be valid and typical

this would be a highly significant result from a public policy viewpoint.

DOT also furnished the Subcommittee an estimate of the costs of these additional experiments. An estimate of approximately one millions dollars would be required to perform the traffic fatality analysis, the crime reduction analysis, and *only* the electricity portion of the energy savings.

The Subcommittee concluded that an expenditure in excess of one million dollars would lead, at best, only to slightly more confidence in results assessing the impact of DST in these areas.

## V. Comparison of Six-, Seven-, and Eight-Month Daylight Saving Time Legislation

At the time of the adoption of the Uniform Time Act of 1966 approximately half of the U.S. population observed DST. About 90 million of these Americans, or 45 percent of the total U.S. population, observed DST from the last Sunday in April to the last Sunday in October. For this reason, among others, Congress adopted that particular 6-month DST period for all the people in the United States.

The Congress did not then have before it the astronomical data which have been prepared for the 94th Congress. (See pp. 21–23.) These astronomical data enable the Congress to consider the number of daylight hours and sunrise and sunset times during the twelve months of the year. These data, along with the known geographical differences in the time zones, permit a detailed assessment of the likely results of particular DST periods.

All of the experimental results indicate small effects, if any, due to the longer DST period under the emergency legislation. There is little confidence, at present, that further experiments would lead to more certain results. There appears to be higher risk to children on their way to school on dark mornings, a consideration appearing to lead to general agreement among Congress, the DOT, and parents that DST periods longer than eight months would increase public concern for their safety.

A majority of the people in the United States appears to favor daylight saving time; however, there are very strong regional effects and significant populations which perceive DST as a problem, particularly when DTS leads to late (clock) sunrises.

The issue of time uniformity in the United States, the rationale for the Uniform Time Act of 1966, suggests that short DST periods would tend to decrease the number of regions exempting themselves from DST. Conversely, long DST periods would tend to increase the number of regions.

Daytime broadcasters and their audiences would appear to be groups which suffer identifiable consequences: loss of revenue to the broadcasters, and loss of useful information to their audiences. For them also, short DST periods are preferable. For one group of daytime broadcasters, the problem is insoluble due to the physics of radio transmissions.

The bounds upon daylight saving time periods are, therefore, not less than six months nor more than eight months. In addition, only those periods which begin after March 1 and end before October 31

appear to satsify the concerns of all groups. Of the 20 bills and recommendations considered by the Subcommittee, only 5 fulfill these constraints: two 6-month bills, and three 7-month bills. (Considering 8-month periods: the DOT recommendation did not form the basis of a bill and extended beyond October 31; an eight-month period—1st Sunday in March to last Sunday October—did not form the basis of a bill; 5 other 8-month bills extended before March 1 or beyond October 31.)

### A. SIX-MONTH DST LEGISLATION

As noted earlier, certain pairs of months, while not equivalent, are comparable. For example, the month of April has earlier sunrises and later sunsets (and consequently more hours of daylight) than the month of September. Therefore, the best six-month period from the standpoint of light is a DST period beginning on the first Sunday in April and ending on the last Sunday in September, as proposed in H.R. 13090. The latest DST sunrise in the United States during this period would be 7:52 a.m. Contrast this with the latest DST sunrise under the Uniform Time Act of 1966 of 8:40 a.m. Since the six-month DST period under the 1966 act runs from the last Sunday in April to the last Sunday in October, the dissimilarity of daytime hours, as well as sunrise and sunset times, between April and October is even larger.

In addition, the six-month period proposed in H.R. 13090 minimizes the adverse effects of late sunrises. Using astronomical data, all possible six-month periods are compared. Any DST period other than that in H.R. 13090 would have at least one later sunrise. The DOT final report suggested using such a "sunrise-symmetrical" system in choosing a DST period; NBS showed how this criterion is useful in judging DST periods.

The six-month period from the first Sunday in April to the last Sunday in September thus resolves many of the existing concerns with DST. Concern for school children's safety in the early morning hours would be reduced in the United States. The problems of other groups such as construction workers and farmers, would be minimized. The Daytime Broadcasters Association testified at the Subcommittee hearings that this six-month period, as proposed in H.R. 13090, would solve nearly all problems of the daytime broadcasters with late sunrises and lost "driving time" listening by commuters. Moreover, their ability to provide necessary local weather and community information would be greatly improved.

However, despite these advantages, there is clearly a desire by many people in the nation for a longer DST period which would provide more light in the evening for recreation and shopping.

### B. SEVEN-MONTH DST LEGISLATION

In choosing a seven-month period for DST, it becomes necessary to balance the concerns of Congress regarding late sunrises with the desire for a longer DST period. The seven-month period in H.R. 13089 was chosen using the astronomical data to minimize the adverse effects of last sunrises. This criterion results in a DST period beginning the third Sunday in March and ending the third Sunday in October.

A possible convenience factor is that the third Sunday in March will be close to the first day of spring, March 21. The latest sunrise time during this period is 8:24 a.m., sixteen minutes earlier than the latest sunrise time during the present six-month Uniform Time Act period. The seven-month period in H.R. 13089 also means that those days with latest sunrises will be fewer in number, in fact one-half as many as under the Uniform Time Act.

The Senate-passed bill, S. 2931, is also a seven-month bill, but runs from the second Sunday in March to the second Sunday in October. This seven-month period was also chosen to achieve a "sunrise-symmetrical" DST period; however, H.R. 13089 "matches" better when the entire United States is considered.[16] The latest sunrise under this period is 8:25 a.m.; therefore, the differences in latest sunrise times between S. 2931 and H.R. 13089 are slight. Under S. 2931 the latest sunrises would occur in March, while under H.R. 13089 the latest sunrises would occur in October. Possibly slightly more inclement weather in March than in October would appear to favor H.R. 13089 over S. 2931.

The seven-month DST period proposed in H.R. 12198 runs from the last Sunday in March to the last Sunday in October. As noted before, the number of daylight hours in April and October are not comparable. Therefore, this seven-month period does not meet the sunrise-symmetrical criterion and has a latest sunrise time of 8:40 a.m.; however, this is no later than under the Uniform Time Act of 1966. Since this bill does not use the sunrise-symmetrical criterion to minimize late sunrises, which both DOT and NBS agree is a sensible criterion, the possibility of future pressures to change the DST period again exists.

H.R. 12198 would increase the amount of DST for those desiring longer periods, but would not provide any benefits to those who do not desire longer DST periods.

### C. EIGHT-MONTH DST LEGISLATION

March and October are also comparable months. In March, sunsets are later than in October; therefore, including additional weeks of March has little effect on minimizing early sunsets, a consideration associated with traffic safety. The greatest effect of the inclusion of additional weeks of March would have to be to increase the number of late sunrises, a consideration associated with morning safety of school children.

Several bills introduced in the House, H.R. 2915, H.R. 6376, H.R. 9247, H.R. 9670, and H.R. 12435, as well as the DOT recommendation given in their Final Report to Congress propose an eight-month or slightly longer period of DST. These bills have latest DST sunrise times varying from 8:51 a.m. to 9:02 a.m. (The latest sunrise under the 1966 Act is 8:40 a.m.) In addition, these DST periods would double the number of days with late sunrises over the number of such days during a seven-month period, thus raising once more the concern for the safety of school children on the roads in early morning darkness.

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[16] The details are given in the NBS Evaluation, at pages 34–36.

With the exception of the DOT recommendation, none of these proposals are sunrise-symmetrical. The DOT recommendation would produce latest sunrises up to 8:51 a.m., 11 minutes later than the Uniform Time Act of 1966.

Another possible sunrise-symmetrical period is the first Sunday of March to the last Sunday of October. The latest sunrise under this period would be 8:40 a.m., the same as under the Uniform Time Act of 1966. However, the number of late sunrise days would be doubled (as noted earlier) compared with the seven-month DST proposals.

The populations in the western portions of the time zones and those in the southern latitudes are likely to be opposed to these bills. (See Map Nos. 2 and 3 at pp. 22 and 23.) The States south of 37 degrees latitude would experience from 15 to 74 days with sunrises later than the latest standard time sunrise, using the 8-month DST period from the first Sunday of March to the last Sunday of October. (Longer periods would lead to more days with later sunrises.) The number of minutes later would range from 18 to 36 minutes later than the latest standard time sunrise. (See Map No. 3 at p. 23.)

The populations residing in areas not affected severely by late sunrises would probably favor an eight-month period. However, the travel organizations testifying at the Subcommittee hearings did not favor an extension beyond seven months.

The basic purpose of the Uniform Time Act of 1966 is "to *foster* and *promote* widespread and uniform adoption and observance of the same standard of time within and throughout each . . . standard time zone." (Emphasis added) An eight-month DST period raises the possibility that non-exempting States which have traditionally had problems with late sunrises during the six-month, last-Sunday-April-to-last-Sunday-October DST period, would consider exempting themselves from the observance of daylight saving time. This runs counter to the 1966 Act's purpose of promoting uniformity of the observance of DST by the States. As the transportation industries all stress, uniformity of observance is the most important factor to them and to the interests of interstate commerce. This was the major goal of the legislation establishing the standard time zones in 1918 and has been preserved by the Congress in considering all daylight saving time legislation.

In Table 2, the likely results of the proposed DST periods are summarized. In Table 3, the bills before the 94th Congress are analyzed. The details are on pages 41 and 43 of the NBS Evaluation.

TABLE 2.—ANTICIPATED RESULTS OF POSSIBLE DST PERIODS

| Months of DST | 6 | | 7 | | 8 | |
|---|---|---|---|---|---|---|
| Bill | Uniform Time Act of 1966. | H.R. 13090 | S. 2931; H.R. 13089 | H.R. 12198 | 1st Sunday in March to last Sunday in October. | H.R. 6376, H.R. 9247; H.R. 2915, H.R. 9670 H.R. 12435; DOT recommendation. |
| Additional DST | None | None | Some | Some | More | Most. |
| Time uniformity | Neutral | Most likely to increase. | Neutral to possible increase. | Neutral | Possible decrease | Possible decrease. |
| Schoolchildren safety in the mornings | Neutral | Greatest reduction in concern. | Some reduction in concern. | Neutral | Possible increase in concern. | Possible greater increase in concern. |

TABLE 3.—DAYLIGHT SAVING TIME BILLS BEFORE THE 94TH CONG. (BILLS AS OF APRIL 1976)

VI. Chart of legislation before 94th Cong.

| (A) Bill | (B) Approximate months DST | (C) Latest DST sunrise in United States | (D) DST period | (E) No DST. Sunrise later than latest winter sunrise | (F) Minimizes lateness of DST sunrises |
|---|---|---|---|---|---|
| H.R. 1504, H.R. 4725, H.R. 5278. | 3+ | 0739 | Last Sunday in May to 1st Monday in September. | Yes | No. |
| H.R. 449 | 4+ | 0739 | Last Sunday in April to 1st Monday in September. | Yes | No. |
| H.R. 5945, H.R. 7102 | 3+ | 0742 | Last Sunday in May to 1st Sunday after 1st Monday in September. | Yes | No. |
| H.R. 4014 | 3+ | 0742 | 1st Sunday after May 30 to 1st Sunday after 1st Monday in September. | Yes | No. |
| H.R. 13090 | 6 | 0752 | 1st Sunday in April to last Sunday in September. | No | Yes. |
| H.R. 13089 | 7 | 0824 | 3d Sunday in March to 3d Sunday in October. | No | Yes. |
| S. 2931 | 7 | 0825 | 2d Sunday in March to 2d Sunday in October. | No | No. |
| Uniform Time Act of 1966 | 6 | 0840 | Last Sunday in April to last Sunday in October. | No | No. |
| H.R. 12198 | 7 | 0840 | Last Sunday in March to last Sunday in October. | No | No. |
| No bill | 8 | 0840 | 1st Sunday in March to last Sunday in October. | No | Yes. |
| DOT recommendation | 8 | 0851 | 1st Sunday in March to 1st Sunday in November. | No | Yes. |
| H.R. 6376, H.R. 9247 | 8 | 0852 | Last Sunday in February to last Sunday in October. | No | No. |
| H.R. 2915, H.R. 9670 | 8+ | 0852 | Last Sunday in February to 1st Sunday in November. | No | Yes. |
| H.R. 10901 | 6½ | 0900 | Last Sunday in April to 1st Sunday after 1st Monday in November. | No | No. |
| H.R. 12435 | 8+ | 0902 | 1st Sunday in March to 2d Sunday in November. | No | No. |
| H.R. 10876 | 12 | 0950 | Year-round DST | No | |

Source: NBS Evaluation, at p. 42. Details are at pages 41 and 43.

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